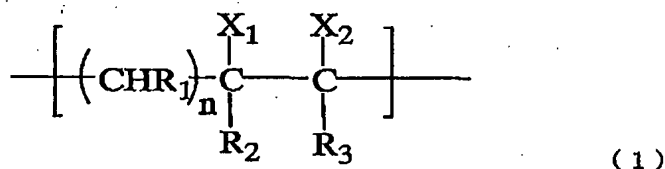


REMARKS/ARGUMENTS

Applicants' representative would like to thank Examiner Teskin for the courteous and helpful discussion of the issues in the above noted application on April 5, 2007. The above amendments and following remarks summarize and further expand on the content of that discussion.

Claims 1-7 are active in this application. Claim 1 has been amended to include product by process limitations, and to remove the extraneous parentheses and correct antecedent basis problems pointed out by the Examiner. The process limitations are supported by original claim 5. No new matter has been added by this amendment.

The present invention relates to a polymer of formula (1):



which is produced by ring-opening a cyclic olefin in the presence of a metal alkylidene complex, with the cyclic olefin having a hydroxy group or a group that can be converted to a hydroxy group. After the ring-opening, the resulting unsaturated polymer is hydrogenated to provide the above polymer of formula (1). The polymer of the present invention not only contains a hydroxy group or functional group that can be converted into a hydroxy group, but also is required to have a total molar amount of terminal aldehyde group and acetal group that is 0.6 mol% or less.

The claims stand rejected under 35 U.S.C. 102(b) or under 35 U.S.C. 103 over Grubbs, either alone or in combination with Bansleben. Grubbs discloses imidazolidine based metal carbene metathesis catalysts that are useful in a variety of reactions, including ring opening metathesis polymerization (ROMP). Grubbs also discloses use of such catalysts to polymerize cyclic olefins, including 1-hydroxy 4-cyclooctene, 1-acetoxy 4-cyclooctene,

(both in Table 3 of Example 6) and 5,6-dihydroxycyclooctene (see Example 4). However, Grubbs does not teach or suggest the hydrogenation of the resulting polymer formed from any of these functionalized monomers. While Grubbs does hydrogenate in Example 8, this is only in a hydrocarbon only polymer, formed from dimethyl-1,5-cyclooctadiene, which does not contain the hydroxy group or functional group that can be converted to a hydroxy group.

Additionally, there is no disclosure within Grubbs that by preparing a polymer by ring opening using their catalyst, and hydrogenating the resulting product that one can obtain the required low level of total molar amount of terminal aldehyde group and acetal group that is 0.6 mol% or less. This has been found by the present inventors to be important in the present invention for providing significantly improved oxygen barrier properties. Such improved oxygen barrier properties are nowhere suggested by Grubbs.

The Examiner has used Bansleben to suggest the hydrogenation step of the present process claim 5, now part of claim 1. However, as discussed with the Examiner on April 5, the Bansleben reference is considered closer to the present invention than Grubbs, as Bansleben teaches polymerization of functionalized cycloolefins followed by hydrogenation to obtain a packaging material. However, Bansleben does not use a metal alkylidene complex catalyst having an imidazolidine ligand as required in the present invention. The catalyst of Bansleben is described at columns 9 and 10, which do not provide for the presence of an imidazolidine ligand. Even if the Examiner were to take the position that the present catalyst is obvious based upon using the catalyst of Grubbs, Applicants have provided comparative data within the specification showing that use of a catalyst such as Bansleben's catalyst does not result in a polymer having the significantly better oxygen barrier properties achieved using the present invention catalyst. These oxygen barrier properties are related to the level of total molar amount of terminal aldehyde group and acetal group in the resulting polymer.

In the present specification, Applicants have compared the polymer prepared from 5-cyclooctene-1,2-diol using a catalyst having an imidazolidine ligand (1,3-bis(2,4,6-trimethylphenyl)-4,5-dihydroimidazol-2-ylidene(tricyclohexylphosphine)benzylidene ruthenium dichloride in Example 1) as compared to the same catalyst used by Bansleben in their examples (bis-(tricyclohexylphosphine)benzylidene ruthenium dichloride, which corresponds to what Bansleben calls "the ruthenium catalyst, phenyl-methylene bis(tricyclohexylphosphine) dichloride"). In the examples according to the present invention, the hydrogenated polymer prepared by ring opening using the imidazolidine containing catalyst, followed by hydrogenation (with examples of two different hydrogenation catalysts being shown) provided a total molar level of terminal aldehyde group and acetal group of less than 0.6 mol%, and resulted in a polymer having oxygen permeation values of less than 1 cc·20  $\mu\text{m}/\text{m}^2\cdot\text{day}\cdot\text{atm}$ .

However, when the polymer was prepared using the catalyst of Bansleben (See Comparative Examples 1 and 2 which differ only in the hydrogenation catalyst used), the resulting polymer had a total level of terminal aldehyde group and acetal group of 0.67 and 0.65 mol%, and provided a polymer having oxygen permeation values of 7 cc·20  $\mu\text{m}/\text{m}^2\cdot\text{day}\cdot\text{atm}$  and 16.2 cc·20  $\mu\text{m}/\text{m}^2\cdot\text{day}\cdot\text{atm}$ , respectively.

The oxygen permeation value provided by the present invention polymers are significantly better than those of the comparative Examples, prepared using the same catalyst of Bansleben for the ring opening polymerization reaction. The comparative examples correspond most closely with Example 3 of Bansleben, which uses the same monomer, and same catalysts as Comparative Example 1. Bansleben nowhere recognizes the importance of maintaining the total molar level of terminal aldehyde group and acetal group to be 0.6 mol% or less, nor the importance that this results in improved oxygen barrier properties. Applicants have shown that by use of the present invention polymers, prepared in accordance with the

claims as now amended and having the requisite level of terminal aldehyde group and acetal group, one obtains significant improvements in oxygen barrier properties. These improvements are nowhere disclosed or suggested by either Grubbs or Bansleben, and as such, the data within the specification is believed to adequately rebut any asserted case of obviousness based upon these two references.

Since the references do not suggest the present invention polymer or process, nor the improvements of oxygen barrier properties obtained thereby, the rejections should be withdrawn.

The rejection under 35 U.S.C. 112, second paragraph and the objection to claim 1 are each obviated by the present amendments and should be withdrawn.

Applicants submit that the application is in condition for allowance and early notification of such action is earnestly solicited.

Respectfully submitted,

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